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History of ophthalmology

The short history of heat cauterisation of the cornea

In 1873, two ophthalmologists independently had the idea of heating a metal instrument to red heat and applying it to the diseased cornea. Samelsohn, in 1874, described heating the instrument with electric current, and termed this 'galvanocautery'. Martinache, in 1873, was content with an ordinary flame. In general, the idea was not attractive to their readers. Neiden felt that this was due to the apparent crudity of the method. However, one or two were inspired to try it, and Sattler presented a report on cautery at the meeting of the German Ophthalmological Society in 1879.

This inspired Fuchs and Arlt in Vienna, who endorsed the method in the *BMJ* in 1880. Fuchs's instrument was a pea-sized metal ball on a probe, which he heated in a gas flame. Having applied it to numerous smallpox ulcers, Fuchs stated that it was a powerful caustic, destroying suppuration and infectious germs to bring about cure. Fuchs's report inspired Gruening to use cautery in a larger series, partly because the advent of cocaine meant that it 'no longer filled the patient's heart with terror'. However, he still heated his platinum probe in a spirit lamp hidden behind the patient's chair. Seven of this series had good results after one application, and the resultant eschar always separated within 24 hours. However, three needed repeated cautery, and in one case the cornea perforated and the iris prolapsed. Gruening, undaunted, states that even this recalcitrant ulcer finally healed. To underline its efficacy in advanced cases, he describes a 'derelict and destitute old woman' who had a deep corneal defect and pus filled anterior chamber. Given three applications of cautery as an outdoor patient, satisfactory corneal healing was achieved.

The most comprehensive trial was done by Neiden, who preferred galvanocautery, while realising its pitfalls. These included using too many elements to arm the loop (which simply melted it) and using white heat (which dazzled the operator's eye). Goodness knows what it did to the patients' eyes! Neiden reported that sometimes, when the loop glowed, the patient noticed the heated point before the ulcer could be touched, and made unforeseen movements. (Undoubtedly straight through the door on some occasions!) Often this caused the loop to graze the adjacent cornea, producing an opaque stripe which fortunately disappeared after 24 hours.

In extensive hyopyon, cautery was used to perforate the ulcer and evacuate the pus. Neiden admits that this sounds rather dangerous on first consideration. Happily, experience showed him that the rapid outrush of aqueous humour cooled the loop, and the danger of heat injury to lens or iris was thus removed. In deliberate corneal perforation, however, the loop had to be balanced carefully on its fulcrum for prompt withdrawal when the stream of aqueous appeared. 'This demands certain steadiness of hand and immobility of eyeball,' stated Neiden.

Initially, he agreed with others that repeated attempts were necessary to remove the detritus from the ulcer base, but learned with experience to cauterise more thoroughly at the first sitting. Cautery was also used in traumatic injury, both to remove rust rings after foreign bodies, and to treat the infective corneal ulcers which sometimes resulted. Neiden was intrigued by the fact that these infections usually occurred in boilermen, whose lesions were also the most resistant to cure. This was put down to the fact that, when injured, they had to continue their shift in conditions of extreme heat, the inevitable profuse sweating being conducive to infection. (Requests to leave work to see the doctor in 1880 would have been met with incredulity, if not physical violence.) Neiden then extended the use of cautery to trachoma and tumours of the lids. His patients appeared to tolerate it well, in spite of the 'considerable hissing' which occurred when probe met cornea. He admits that he cauterised under the pretence of being obliged to remove a foreign body clinging to the eye. (So much for informed consent in the 1880s.)

Although Neiden, Sattler, Fuchs, and Arlt agreed that cautery had much to recommend it, these were mere small islands in the general sea of dissent. With 'chemical' treatments of ulcer such as antiseptic and iodoform just around the corner, reports on cautery rapidly disappeared from the literature, never to be seen again.

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